Microsoft Exchange Server

Chapter 2
Making the Decision to Migrate

Planning Guide

Abstract

This chapter presents some logical processes to help you identify the features of Exchange 2000 that will have the most affect on your organization. These processes will help you review the various factors to consider when planning your migration. Understanding the existing architecture, technical benefits and considerations for the upgrade to Exchange 2000 will prepare you for the migration, whether that step takes place immediately or at a later date.

This is a preview edition of the Microsoft Exchange 2000 Server Upgrade Series. The final documentation will be available in November 2000.

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INTRODUCTION

Exchange 2000 is a major architectural revision to the Exchange product line. Its new capabilities in the areas of server capacity, reliability, scalability, connectivity, administration, and monitoring will affect organizational messaging deployments. Some of these new capabilities are outlined at a high level in Chapter 1, “Overview of the Exchange 2000 Migration Planning Process”. All of these features can benefit an organization. However, bigger organizations (for example, LIC, LIO, LNC and MNO types), and larger branch office organizations are likely to benefit most from server consolidation, the new development capabilities, and the new collaboration features integrated into the product.

A large number of organizations have implemented Exchange 5.5 to meet or exceed all of their immediate messaging requirements. Many organizations are changing the way that they use messaging, in order to work more efficiently with the same or fewer personnel and to develop systems that cost less to maintain and operate. Because messaging is at the heart of this change, the messaging systems are now being used in different ways than ever before, using new technologies that make collaboration even easier.

Coping with the changing requirements of business-critical processes, in addition to enhancing the capabilities of individuals and teams within organizations, means that messaging and other systems need to be improved in functionality and capability. This requirement, in conjunction with the ever-present need to reduce cost of operation, means that the messaging architecture must encompass new capabilities to address better work styles and to take advantage of overall cost of operation savings.

When an organization decides to upgrade an existing Exchange 5.5 system or to implement Exchange 2000 in a new environment, a number of technical factors need to be considered. This chapter will identify these factors and give guidance in terms of how best to address any technological impediments to the deployment of the product.

Factors relate to enhancements for:

- Scalability
- Reliability
- Performance
- Collaboration
- Administration
- Development

An initial assessment of the architecture will help you determine the most important features and changes to your existing implementation, and will

thereby help you prioritize the implementation of specific features of the product.

Design Considerations

This chapter is geared toward providing you with the information required to make an informed decision about the use of specific features in Exchange 2000 in a native or mixed Exchange 2000/5.5 deployment. It is assumed that the reader is a technical business decision maker in a organization of a type described in Chapter 1, “Overview of the Deployment Process”. The described features factor into the decisions for the initial deployment, the decision to migrate, and the type of deployments performed.

Resource Requirements

Choosing the implementation points for an Exchange 2000 upgrade or a new deployment will require the following types of personnel, and may require additional support from other areas as the project scope expands or addresses concerns that are specific to another part of the organization.

If your organization is relatively small, you will probably not have the level of specialization shown in the following section. However, you have the option of hiring a consultant or a Microsoft Certified Solution Provider (MCSP) with the necessary experience. To contact a suitable MCSP, go to the referrals page at http://mcspreferral.microsoft.com/.

Executive Sponsor

Without sponsorship from upper management, any large project undertaking will fail. Sponsorship should be obtained before proceeding with the design. Your management sponsor can also help you with various tasks during the implementation process, as you will see in the section on deployment in Chapter 1, “Overview of the Deployment Process” and Chapter 12, “Promoting an Exchange Pilot System to Production”.

Active Directory Architect

A person with Active Directory design experience is needed to design an Active Directory structure to meet both the business requirements of the organization and the technical requirements of Exchange. This person should be familiar with Exchange 5.5 and Windows NT 4.0 as well, as in many cases these will already be in place.

Exchange Architect

You will need an Exchange Architect to help design the Exchange 2000 solution. This person will be responsible for all phases of Exchange design, including routing, defining administrative groups, and a disaster recovery plan.

Preview Documentation

Business Decision Makers

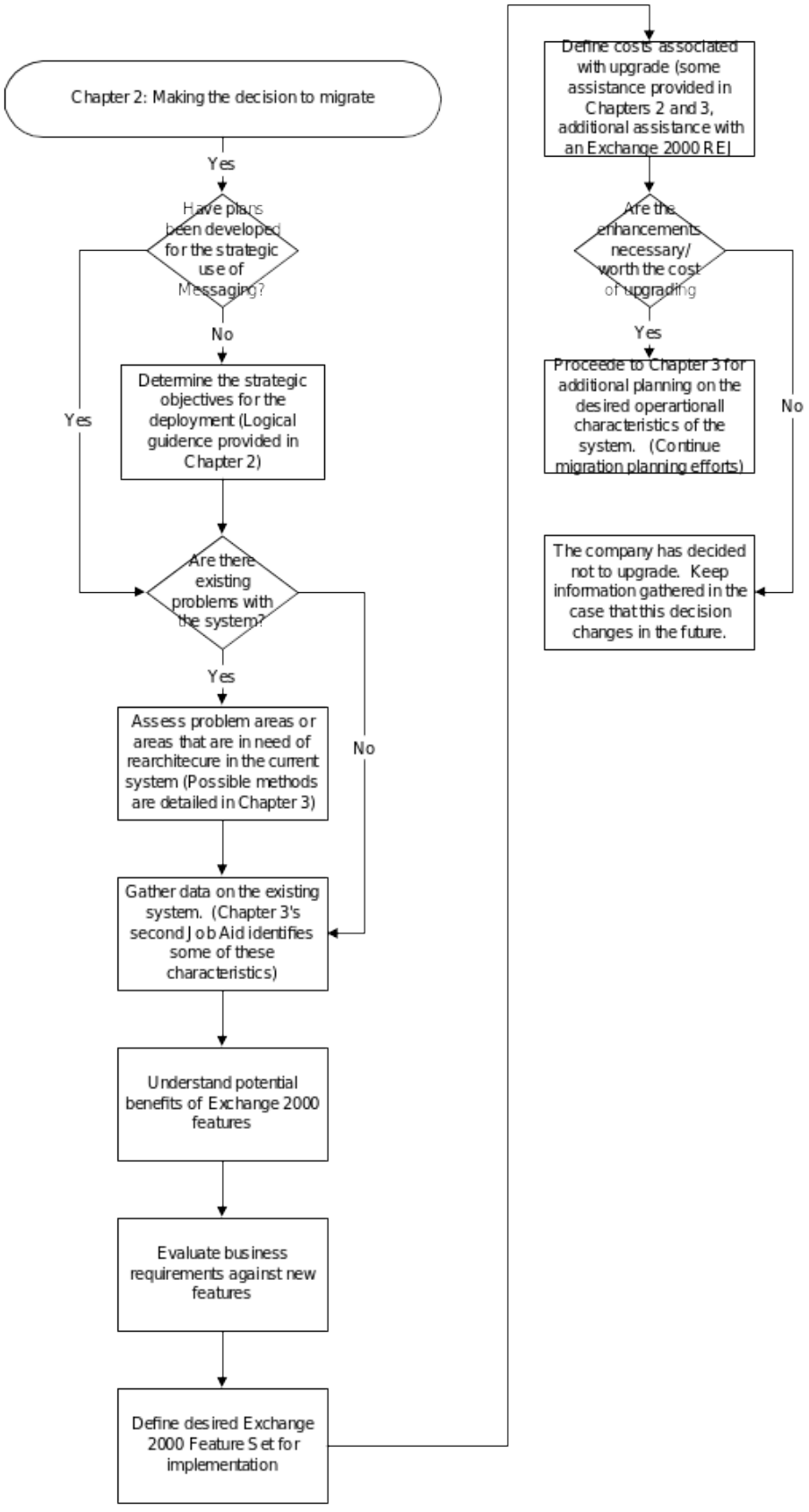
Leaders of the various business units should be interviewed to generate a list of technical requirements for the Active Directory and Exchange designs.

System Prerequisites

An understanding of how the existing system is currently used is necessary for evaluating the potential success of the migration. In order for the process presented in this chapter to be successful, the resources should have a thorough understanding of the existing messaging architecture and the technical strategies for the messaging architecture going forward in the organization.

Key Points From This Chapter:

- Upgrade decisions should be based primarily on an organization’s strategic objectives and business needs.
- After that, upgrade decisions should be based on the current architecture’s inability to satisfy the organization’s needs.
- Organizations that already have Exchange 5.5 implemented, and who are experiencing no problems, will still benefit from Exchange 2000 in server consolidation and Real Time Collaboration (RTC) areas.
- Market forces indicate the consolidation of resources/management personnel and operations areas as a business motivator. Exchange 2000 facilitates this (better management capabilities/more users per server).


Chapter 2: Making the decision to migrate
Yes
Have plans been developed for the strategic use of Messaging?
No
Yes
Determine the strategic objectives for the deployment (Logical guidence provided in Chapter 2)
Are there existing problems with the system?
Yes
No
Assess problem areas or areas that are in need of rearchitecure in the current system (Possible methods are detailed in Chapter 3)
Gather data on the existing system. (Chapter 3's second Job Aid identifies some of these characteristics)
Understand potential benefits of Exchange 2000 features
Evaluate business requirements against new features
Define desired Exchange 2000 Feature Set for implementation
Define costs associated with upgrade (some assistance provided in Chapters 2 and 3, additional assistance with an Exchange 2000 REI
Are the enhancements necessary/ worth the cost of upgrading
Yes
No
Proceede to Chapter 3 for additional planning on the desired operartionall characteristics of the system. (Continue migration planning efforts)
The company has decided not to upgrade. Keep information gathered in the case that this decision changes in the future.

PROCESS FLOWCHART

DETERMINE STRATEGIC OBJECTIVES

Exchange 2000 encourages the implementation of a very flexible messaging architecture to fulfill a variety of business requirements. Most organizations that are evaluating the feasibility of upgrading to Exchange 2000 have already deployed Exchange 5.5 and have explicit business reasons for upgrading. Specific improvements to be expected from the upgrade include:

- More efficient usage of the machines involved in the architecture.
- Higher reliability and stability.
- Better performance to comply with increasingly stringent service level agreements.
- The ability to take advantage of other technologies (such as Windows 2000 Active Directory) for better or more uniform management.

Base Upgrade Decisions On Strategic Initiatives

Every organization will have a unique evaluation process for implementation, based in some degree upon specific business considerations. The areas in which companies will want to see the most improvement, or the quickest implementation of Exchange 2000, are dependent upon a number of factors:

- The architecture that is already in place.
- How the current architecture is being used.
- Whether or not the existing architecture is meeting business needs.
- The most pressing use and functionality initiatives required from the messaging infrastructure.

Each customer will be driven by their own priorities when evaluating the enhancements found in Exchange 2000. The three basic areas that are likely to impact the largest customer base are related to the enhancements in the categories of:

- Reliability
- Scalability
- Collaboration

While these three factors may range higher or lower in priority based on the customer’s specific issues, it is likely that these areas will be the predominant drivers for the deployment of Exchange 2000 across many large organizations. Other areas of functionality will likely be drawn into the architecture after the initial concerns are addressed. These additional technologies could include the stabilization and consolidation of the architecture, and the deployment of collaborative features such as Audio/Video conferencing.

UNDERSTAND CURRENT IMPLEMENTATION

Gathering information about the current implementation will provide valuable insight into the changes that need to be made for the upgrade to Exchange 2000. The following questions can help you understand how the messaging system can take advantage of the new capabilities in Exchange 2000:

- What has already been deployed within the messaging infrastructure? Where are the servers, and what role do those servers perform in the architecture?
- Are there any known problems with the current implementation that need to be resolved or addressed in the rearchitecture?
- What business functions does the messaging infrastructure facilitate today?
- Ideally, how should messaging be used in the organization? How does messaging equate to strategic objectives and what business functions should messaging facilitate tomorrow?
- How is the current implementation managed and who is managing it?
- Are the current escalation and troubleshooting processes appropriate?

The documentation that answers these questions typically falls into the following categories:

Documentation Type	**Contents**	**Examples**
Technology	Architecture of the messaging system	• Architecture Requirements • High Level Design Requirements • Server Design • Public Folder Design • Site Design • Directory Synchronization (Both Windows NT and Exchange Directories) • Windows NT Domain design • Name resolution: Windows WINS Design and DNS • Windows NT DHCP Design.
Deployment and Migration	How the initial deployment was conducted.	• Server Build and Deployment Process • Desktop Deployment Process • Data Migration Process
Staffing and Skills	Support staff information.	• An Organization Chart for the support organization • Competency profiles and job

		descriptions for each of the following classes of operations personnel: • Development • Engineering • Deployment • Operations • Administration • Help Desk • User Education
Project Planning	Details of the initial planning process for the existing implementation.	• Services • Change Management • Functional Specification • Server Release Strategy • Development/Engineering • Testing • Deployment and Retrofit • Deployment Schedule • Site Discovery
Operational Tools and Processes	Processes to manage the messaging system.	• Backup and Recovery procedures • Descriptions of regularly scheduled maintenance • Process for the application of OS Service Packs • Status Monitoring processes • Message routing • Server Services • Event Logs • Performance Trending • Service Level Agreements • Metrics • Reporting • Incident Tracking • Escalation processes including: • Internal Escalation • External Escalation • Remote Operation Capabilities • Network Monitor Agent usage guidelines

Once the documentation from the above categories has been obtained and reviewed, it may also be necessary to perform an inspection of the Windows NT and Exchange servers that will be implementing the

architecture. This inspection will ensure that the machines are configured and being managed according to the documented processes. Carry out this procedure to ensure that these resources meet the documented specifications, and that their management and use are congruent with your existing high level design.

For the majority of large organizations, there are two compelling reasons to upgrade to Exchange 2000. These are:

- Consolidation: either reducing the number of servers in the architecture, or increasing the number of users on each server.
- Real-time collaboration: take advantage of tools like Instant Messaging and Real Time Audio/Visual Conferencing.

Both of these are primarily tactical reasons to upgrade. More strategic reasons include:

- The support for new clients based on emerging technologies.
- Changes in the way that messaging is used within the business.
- Emphasis on the messaging system as a development platform.
- A strategic change in the nature of the company (for example, a merger or acquisition).

Features Enhancing Scalability

Enhanced scalability covers any feature or architectural benefit that allows the system to support more users in total, even if exploiting that feature means the addition of extra hardware. However, in many cases the addition of hardware may not be required. Scalability-related features that do not require extra hardware are usually the ones that most large organizations will want to implement first. In many cases, customers have deployed Exchange 5.5 servers that are not taking full advantage of their resources, either with respect to memory, CPU, or storage. Scalability-related features can remove internal system bottlenecks in these underlying resources causing the existing server hardware to be capable of supporting more users.

Front End/Back End Architecture Enhancements

Requests from Internet Protocol clients (such as POP3 and IMAP) can be redirected to supporting back-end mailbox servers using a Front End protocol server. This allows client requests handling and processing storage requests to be segregated between the two types of server (front-end and the back-end, respectively). Separation of the clients' requests from the storage of the clients' information means that the servers providing each of the services can be tuned to match their role. For more information on tuning Exchange 2000 servers, see Chapter 10,

“Tuning Exchange 2000 for Performance”. You can achieve additional scalability and reliability by placing front-end proxy servers in a Windows Load Balancing Cluster.

Active/Active Clustering

Although clustering does not eliminate all of the potential points of failure on a system, it does remove several single points of failure that are client connection centric. It also offers the ability to use excess hardware within the cluster to support more concurrent user connections. An Exchange 2000 cluster is comprised of 2 or more nodes (4 cluster nodes are possible on an Exchange 2000 SP1/Windows 2000 Data Center Cluster) running Exchange 2000 Enterprise Edition and Windows 2000 Advanced Server. Each node is capable of hosting active user connections; that is, one cluster node no longer waits idly for a failure of the other node before becoming active.

Native Content

Native content (also called lazy conversion) in the Exchange 2000 store ensures that incoming content is maintained in its original format, thereby reducing the conversion load on a given server for clients that connect via the same protocol. While this has the most impact in the case of the Internet protocol clients, it also reduces loads on servers that are hosting the same types of clients (either MAPI or Internet Protocol). To optimize the effect of this benefit, place all clients who use a specific connection protocol on the same server.

Storage Improvements

In most corporate deployments of Exchange you will find performance and operational bottlenecks that affect the overall scalability of the server in terms of number of concurrent users per machine. These bottlenecks generally occur in four major areas:

- The Exchange store, which has traditionally been operationally limited to 50-60GB for backup and recovery reasons. This limit allows for approximately 1500-2000 max users per server with a single store. This limit is rectified through the addition of multiple store capacity to the Exchange 2000 product.
- The system CPU resources on connector servers that are very CPU intensive. However, mailbox servers, which are usually limited by the operationally imposed store limits, rarely show this limitation. Front End/Back End architecture changes in Exchange 2000 remove this limitation.
- Exchange system memory, which traditionally has also been limited because of the underlying bottleneck in system storage and its corresponding operational limitations. Front End/Back End architecture changes in Exchange 2000 remove this limitation.
- The network, which is becoming a more common limiting factor as

systems begin to reach larger and larger user populations. Network bottlenecks are more often seen in a WAN setting rather than a LAN/MAN setting. In most cases, the underlying limitations on the number of users that can be hosted within operational limits have prevented an organization from seeing bottlenecks unless a WAN has been involved. Quite often, sites in an Exchange 5.5 organization may have been deployed simply because of WAN bottleneck issues. The adoption of lighter weight client access protocols, such as Distributed Authoring and Versioning (DAV) resolves a portion of this issue. More efficient communications between servers, as in the case of front-end/back-end architectures rectifies this from a server to server perspective.

In most Exchange 5.5 implementations today, the store limitations are the first limiting factor experienced. Exchange 2000 adds support for multiple private information stores and public folder databases grouped into storage groups. This new technology offers the capability to scale the number of users on a server beyond the present limits. Deploying 7-8 private stores per server means that an organization can consolidate more users onto fewer pieces of hardware while still maintaining the service level agreements associated with the system. This also facilitates the organizational trend towards server consolidation into regional or departmental data centers.

Active Directory Separation

Exchange 2000 uses the Active Directory for authentication, to store configuration information, and to store users' messaging properties. Because Active Directory is hosted on its own infrastructure, distinct from the operating system, the Active Directory Service can be viewed as a layered service in itself. Hosting this service on several domain controllers means that bottlenecks from authentication and replication traffic can be avoided. This also means that the load on any given Exchange 2000 server will be reduced, as the Exchange servers will not need to deal with authentication or management of Active Directory.

Features Enhancing Reliability

For the purposes of this book, messaging architecture reliability is defined as any reduction in the number of moving parts in the solution, and the improved availability that results from one or more core changes in the product. Reliability features can be targeted at reducing unplanned downtime in the system caused by:

- Operating faults (for example, power failures, or critical system failures)
- Database/Storage integrity checks and repairs
- Emergency Operating System maintenance

- Memory leaks in critical processes

Additional features can minimize planned downtime, such as that incurred from:

- Backup and Restore of the system
- Database/Storage maintenance (for example, compression of the database)
- Layered software upgrade (for example, upgrading from Exchange 5.5 to Exchange 2000)
- Application of Service Packs to the core Operating System

Storage Improvements

By spreading the user population on a server across multiple data stores, the affected population in the case of a failure is much smaller, and consequently more users are able to use the system for longer periods of time. This creates higher overall availability of the system. By reducing the size of each data store on a given machine (even though the time to recover the entire server, which is now hosting multiple databases, in the case of a catastrophic server failure is extended) the ability to recover quickly from anything other than a complete failure of the system is reduced. This size reduction also means that backup processes take less time, again providing higher availability/reliability. Complete server failures would take longer to recover from, there are more databases on a single server and only one database can be restored (within a storage group, and there can be 4 storage groups per server) at a time. Given the resilience features that are built into the highest end/most scalable servers on the market today, if complete server failure were to occur it is entirely likely that the SLA for the recovery would be drastically extended or that operations staff would have much larger and more pressing problems than the recovery of a single server. It is likely that an entire data center would be the cause for such a catastrophic failure.

Clustering (Active/Active) Increased Availability

Clusters in Exchange 2000 offer a functional solution for high availability. Being active/active means that organizations can better leverage cluster hardware to sustain higher concurrent user access to clustered resources, while still offering fault toleration in the overall solution. However, clustering does not make sense for connectors and FE servers. Multiple connector servers provide better fault tolerance support for foreign system connections. FE servers should use Windows Load Balancing Software (WLBS) for fault tolerance.

New Routing Topology

Many organizations base their internal and external service level agreements on the time it takes to deliver messages. While difficult to enforce in most cases, these values have become adopted as the

performance bar against which most messaging implementations are judged. The improved routing topology in Exchange 2000 offers these customers dynamic state information on each of the routing nodes in the architecture. In the case where problems occur on routing nodes in the topology between Gateway Address Routing Table (GWART) recalculations, this theoretically leads to a faster end-to-end delivery of the message.

Active Directory Separation

Having the Directory Service hosted on alternate machines, and having built-in fault tolerance characteristics associated with single point Directory Server failures (Global Catalog Server's are re-acquired if the current Global Catalog Server fails), means that there is an overall reduction in the number of processes that can fail on a server in the messaging infrastructure. The net effect of this segregation of services is the removal of DSAMain.exe as a potential point of failure for client connections from the Exchange servers. Consequently, servers are able to perform better and tolerate single point directory failures better.

Features Enhancing Performance

Features that enhance performance are defined as any feature or architectural benefit in the product that causes the system to perform message handling in a more efficient or faster way, or causes the client to wait less time for the completion of server side operations.

New Routing Topology

The ability to deliver messages based on contingent routing within a dynamically changing topology is also a way to ensure faster end-to-end message delivery. Exchange 2000 routing group connectors make use of Simple Mail Transport Protocol (SMTP) and an extended routing command structure based on Open Shortest Path First (OSPF) routing. These are coupled with lazy conversion of content so that content undergoes fewer transformations while being dynamically rerouted to avoid network faults. This architecture allows for mail to theoretically be delivered more quickly.

Native Content/Lazy Conversion

As explained earlier in this chapter, this capability ensures that message content is preserved in its original format as long as possible. Therefore, at least some messages are never converted, or are converted fewer times. This frees up resources that would have been involved in the conversion process, thereby enhancing performance.

Front End/Back End Architecture Enhancements

Exchange 2000 uses an efficient cross-process communication mechanism to efficiently take apart and process messages. Performance-related architectural benefits are also associated with the use of front-end/back-end topologies. For example, the (Internet Protocol only) client can access a farm of front-end servers, that have been specifically tuned to perform a fast relay of their request, to a back-end architecture that has been specifically tuned for enhanced store performance.

Architecture Can Support New Technology Clients

Future clients will make use of Distributed Authoring and Versioning (DAV) and other technologies to connect to information in Exchange 2000 servers. Exchange 2000 is ready for these types of client connections today, supporting native HTTP requests as well as DAV formatted command processing. DAV in Outlook 10 and IE client connections means that properties on individual messages can be changed without affecting the transfer of the entire message. The net effect is that properties become the atomic unit of change on a message, instead of the message being the unit of change (as in the Exchange 5.5 MAPI implementation). Significant performance gains accompany this change, particularly in the case of highly mobile clients that always work offline and synchronize against a server using synchronization profiles that are tuned to take advantage of particular types of connections. The net effect of this enhancement is an overall reduction in the amount of traffic from client to server to maintain a certain level of user experience. The benefits increase exponentially when this capability is coupled with the capability to proxy DAV requests in a front-end/back-end architecture.

Features That Enhance Collaboration

Collaboration is a fundamental focus of Exchange 2000. Features that are collaboration-focused are defined as any feature or architectural benefit in the product that causes users of the system to be able to:

- Communicate more efficiently
- Operate against shared information
- Have a shared or enhanced messaging experience

Instant Messaging (Presence Information integration)

Increasingly, Instant Messaging is being used throughout organizations as a communications transport for time-sensitive messages. The nature of traditional messaging is that the time to delivery varies depending upon when the user connects. There is no way to know when this will happen if you are the sender of an item. The integration of *presence information* into the messaging topology not only reduces the traffic associated with quick personal messages, but also allows the sender of information at least some modicum of knowledge of the recipient's capability to respond. By letting a sender know if a recipient is capable of responding to a given request within a projected time frame, the sender can determine whether the recipient's likely response time is acceptable, or if an alternate recipient should be contacted. This enables an entirely new class of applications, integrated with time sensitive business processes, to be developed on top of the messaging system.

Enhanced Outlook Web Access (OWA)

Exchange 2000 offers a rich Web-based access capability, which will likely be exploited in Kiosk-based mailbox access as well as in development efforts for corporate Intra/Extranets. It is likely that the enhanced Outlook Web Access (OWA) capabilities will be an early benefit for select user populations in larger deployments. Exchange 2000 Web client access is possible only against Exchange 2000 store servers; therefore, user's wishing to use the new Web client to access their mailboxes will need to have their mailbox data already hosted on an Exchange 2000 server. The presence of OWA as a service for data center centric deployments is a likely phenomenon, because it will be easier to implement in fewer locations and server consolidation will likely lead to faster upgrades of user servers in data centers.

Web Storage System/Multiple TLH/Web Based Applications In Pfs

Public Folders have been available as a development option with previous releases of Exchange; however, they have typically received limited acceptance in corporate deployments because of lagging Public Folder architecture and deployment issues, and client considerations. With the capability to host Intranet applications in the Public Folder hierarchy or their own top level hierarchy, Exchange 2000 Public Folder development

stands to be one of the first features to be exploited by developers. Direct access of Web clients to applications in the Exchange 2000 Web storage system makes Web storage hosted applications indistinguishable from their IIS hosted counterparts. At the same time, the Exchange 2000 Web storage system can provide the replication, management, and administrative benefits of what would have traditionally been considered a Public Folder Application. Heavy reliance on application specific schema hosted in the context of a folder, Extensible Markup Language (XML) technologies coupled with a variety of access protocols from HTTP to ADO/OLEDB, and support for Collaboration Data Objects (CDO) for message item programmability, make the Web Storage System very compelling for development of Intranet and corporation wide applications.

Audio/Video Conferencing

Although not a feature of Exchange 2000, the capabilities included in the Exchange Conferencing Server product are likely to drive the adoption of Active Directory and the required supporting infrastructure for Exchange 2000 deployment in organizations. These features will probably be the first collaboration features that are exploited in larger organizations. Adoption of these services should be encouraged during the planning stage for the deployment of the supporting infrastructure, so that it can be leveraged by a future, full-scale deployment of Exchange 2000. Planning for the migration of user mailboxes while simultaneously planning for the consolidation of user servers will prevent any subsequent delay.

Features That Enhance Administration

Defined as any feature or architectural benefit in the product that causes management or administrative tasks to be easier to carry out or more integrated with other like tasks (against other systems) within the organization. May be defined as features in the product that also provide the capability to further segregate the management of messaging related functions from other systems while still promoting the use of a common administrative interface and mobility of user experience for administrators. This feature area will also encompass reporting and auditing activities associated with the system.

Directory Integration with Active Directory/Policy based Management

Exchange 2000 uses Active Directory as a repository for not only configuration information but also the definition of user characteristics for the messaging system, the latter being defined as attributes on user security principles. The integration with Active Directory also provides other inherent system management related benefits: for example, the configuration of security and configuration through computer policy and Group Policy Object (GPO) extensions. This single source management

can be viewed as a huge benefit for distributed organizations in terms of an overall reduction in replication traffic, and a corresponding decrease in the bandwidth utilized between servers

Microsoft Management Console (MMC) Integration

Exchange 2000 uses the Microsoft Management Console (MMC) to host Exchange system management capabilities. The important aspect of MMC-based management is that it will encourage the migration in the management efforts associated with the two largest administrative functions in the organization (Windows account management and messaging resource management) into a single interface.

Unified Security Concepts/Simpler ACL Assignment

Windows 2000 Access Control Lists (ACLs) are the means by which permissions are assigned on objects in the Exchange 2000 infrastructure. With previous versions of Exchange, some access permissions were based on Distribution List membership; this is no longer the case. Every object in the Exchange 2000 architecture is tied to a Windows security principal that can be used in an ACL.. Even the message objects within the system have ACL attributes in the familiar Windows 2000 format and share a security picker dialog with other files system objects. Additionally, the concept of a distribution list (now referred to as a “distribution group”) has merged with the definition of Windows NT security groups, becoming, simply, a special type of Windows NT security group that is mail enabled. The common roles from Exchange 5.5 and previous permissions administration are now Windows 2000 security groups that can be audited like any other security object in the operating system.

WMI/CDO for Exchange Management

The new version of Performance Monitor can be used to track the operation of the system to a much more granular level than previously possible. Windows Management Instrumentation (WMI) provides a much more scriptable and programmable interface than was previously possible with performance monitor. These capabilities are important to corporations that need more granular specification of system characteristics for compliance with ever more complex service level agreements. It is likely that internal bill back/usage reporting applications will be developed in these organizations, leveraging the Application Service Provider toolset for WMI and Business/Operating Support Services (BSS/OSS) integration so that the cost of management can be distributed across multiple operating entity profit/loss areas.

Features That Enhance Development

Features that enhance development are defined as technologies and functions that are implemented in the product that make the messaging

platform more conducive to the development of applications in the organization. Within the context of the Exchange 2000 product, these features are mostly described in the context of Web forms and Web storage system components.

Web Storage System

The Web Storage System is the heart of the new development capabilities in the Exchange 2000 platform. Capable of distributing and isolating applications and leveraging the newest technologies in its support for native HTTP URL support and XML parameterization, the Web Storage System is a boon for developers of Intranet and organizational applications. Forms in Exchange 2000 Web Storage System based applications are deployed in the context of a folder which contains schema, items, and forms, all of the items necessary for an application. Replication of the application in the MAPI top level hierarchy is automatically performed on to replicas of the folder across the organization. Forms, when activated by a client, are installed on that client (cached) in the case of Web forms. MAPI forms perform exactly as they did in the earlier version, Exchange 5.5.

XML Support

The Web Storage System allows the extension of properties that are specific to types of data. These extensions are stored in the form of an XML schema in the context of a folder in the Webstore and in the form of XML properties that are promoted to MAPI properties on items in the folder. Application code can be triggered based on events in the Web Storage System itself. The ability to trigger a series of events allows applications such as workflow applications to be authored against these properties on items in the Web Storage System. XML properties allow the description of the types of items in the folder itself, with code registered for viewing specific items based on selection triggers. This allows the client to present a smart preview of the item based on knowledge of the properties on the item. These properties are promoted to MAPI properties so they can be viewed by down level, non-DAV capable clients as well as DAV clients.

OLE/DB and ADO

Active Data Objects (ADO) and Microsoft’s strategic, efficient, low level programming API for access to different data sources OLEDB are core programming interfaces that are typically found in high end relational database programming. With the release of Exchange 2000, they are also available as navigation APIs for the Web Storage System. These interfaces provide very sophisticated record set manipulation and construction capabilities that were previously not available with MAPI or CDO. Although all items and properties are accessible via ADO/OLEDB, it may not be the best interface to use for all functions. In CDO, these actions are possible with just a couple of lines of code; in the case of

direct ADO this may be exceedingly complex.

Workflow (Engine/Events/Tools)

Several types of applications exist within most organizations: ad hoc unstructured, team process automation, Line of Business/Production, and Inter-Organization software. Exchange 2000 is suited to team process automation and ad hoc/unstructured applications. Workflow in the context of the Web Storage System is based on store events (save or post). Any actions can be performed in the context of a workflow. Workflow applications can be created in Exchange 2000 Workflow Designer contained in the Microsoft Office Developer or the Exchange SDK. Workflow Process Definition documents, containing the workflow table, are stored in the Exchange store. Workflow event sinks are registered by the Workflow Designer within the folder that will contain the application and, once registered, this event sink traps all changes performed on items within the folder and calls the workflow engine to verify changes and actions.

Outlook Web Access (OWA)

Outlook Web Access (OWA) in Exchange 2000 has new capabilities and a much richer user interface based on Dynamic HTML. When used in conjunction with a DHTML aware client, additional behaviors such as drag and drop become possible. These behaviors enrich user interaction and the client. Each item in the Web Storage System (also used for the storage of Exchange message items) is accessible with a straightforward HTTP URL, making client navigation of the items in the server storage very simple. It is also possible to use the HTTP client in other applications as a component.

Determining Strategic Business Objectives

Companies typically conduct detailed deployment planning that relates to quantifiable business objectives. These objectives apply to the messaging system as well as to the rest of the information systems architecture. Samples of this type of strategic long term planning include:

1. Reduction of the number of authoritative directories in the organization and a corresponding reduction in the amount of management overhead associated with person/object management.
2. Simplification of the more ubiquitous storage of information, searching for information, and access to information.
3. Lowering cost of operation of the messaging infrastructure.
4. Improving performance and reliability of the infrastructure even as new collaborative capabilities are added to the overall system or overall

system capacity is increased.

Once these objectives have been identified, it is a relatively straightforward process to map the Exchange 2000 feature sets to the business objectives for the organization. As mentioned earlier in the chapter, the selection of strategic initiatives will be very specific to an individual company; however, some of the most common categories are outlined in the table below.

Sample Feature Mapping For Some Selected Business Objectives

Primary Organizational Objective	**Features of Highest Impact**
Lowering cost of operation	More databases/smaller databases/store improvements Clustering (Active/Active) increased availability New routing topology Active Directory separation Directory Integration with Active Directory/Policy based management MMC Integration Unified security concepts/Simpler ACL assignment
Improving performance and reliability	More databases/smaller databases/store improvements Clustering (Active/Active) increased capacity/scalability Front End/Back End Architecture enhancements New routing topology Native Content/lazy conversion Architecture can support new technology clients Active Directory separation
Increasing capacity of the system	Front End/Back End Architecture enhancements Clustering (Active/Active) increased capacity/scalability Native Content/lazy conversion More databases/smaller databases/store improvements

SUMMARY DETERMINING THE COST OF THE UPGRADE

	Active Directory separation
Enhancing collaborative capabilities	Instant Messaging (presence information integration) Enhanced Outlook Web Access Web Storage System/Multiple TLH/Web based applications in PFs Audio/Video conferencing

Perhaps the most difficult part of the decision to migrate is determining the cost of the migration. For organizations that perceive messaging to be a business critical component the real question is not “How much does it cost us to migrate?”, but “How much will it cost us (in terms of lost functionality and lack of capability) not to migrate?”

Tools are available to help an organization determine the overall cost of operation for their messaging infrastructure. For example, organizations such as Gartner, Andersen Consulting, and Deloitte Consulting will often evaluate the costs of operation for a given system by performing an audit. Microsoft Consulting Services (MCS) provides a similar service, called Rapid Economic Justification (REJ). This process is under development for Exchange 2000, and is obtainable as an MCS engagement. The REJ process is designed to help an organization quantify costs of upgrading in the face of new capabilities.

The result of the evaluative process in this chapter is an understanding of the key areas that are of the most benefit to the organization or most closely aligned with the strategic plans for use of the messaging system. This understanding is crucial to the decision to migrate, and allows priorities to be assigned to the features that are most pressing for the organization. After this evaluative process, the next step is to evaluate technical issues with the deployment of the revisions to the messaging architecture. This next step is detailed in Chapter 3.

More Information

- The Exchange 2000 Datasheet: http://www.microsoft.com/exchange/productinfo/E2K_Datasheet.htm
- The Exchange 2000 Features Overview: http://www.microsoft.com/exchange/productinfo/FeaturesGuide.htm
- Planning your implementation of Exchange 2000 (white paper): http://www.microsoft.com/exchange/techinfo/Planning.htm
- The Business Value for Exchange 2000: http://www.microsoft.com/exchange/productinfo/BizValue.htm